
Split Air-Air Heat Pumps SOH-076 to 240B and G/ SICH-070 to 240B



Ref: E-TG-SOH-SICH B+G 0104

Technical information



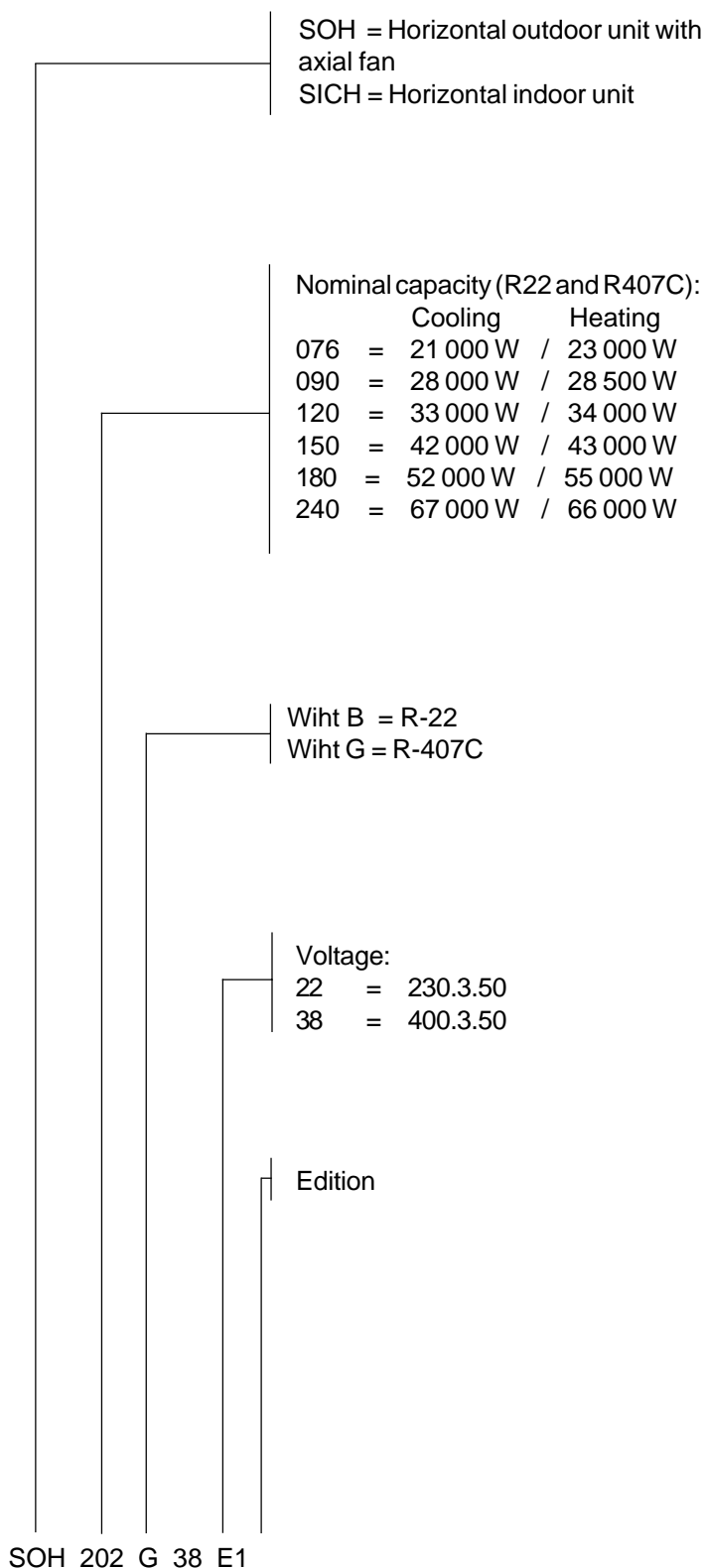
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General information

Nomenclature



General description

The SOH-B and G series units are the outdoor units of a split type heat pump, equipped with a vertical discharge axial fan and ready to be installed directly outdoors.

The SOH-076 to 180B and G units are compatible with indoor units SICH-070 to 180B.

The SOH-240B and G outdoor unit is compatible with the SICH-240B indoor unit.

For adequate operation, both the electrical as well as the cooling sections of these units need to be connected to the corresponding indoor unit.

The SICH indoor units can be equipped, as an optional accessory, with an electric heater or a hot water coil for auxiliary heat in the case of an emergency.

Technical specifications

Mechanical specifications

Compressor

Vertical hermetic type. Mounted on antivibratory supports and has internal motor protection. Includes an electric heater for heating the oil in the sump to make start-up easier and avoid loss of oil in compressor.

Coils

Of a large surface, made of grooved copper tubing and notched aluminium fins.

Fans (outdoor units)

Axial with free air discharge, without ducts. The unit is equipped with a speed selector in summer cycle that is regulated by the high pressure of the cooling circuit.

Fan (indoor units)

Centrifugal, with dual helix and a shaft in common, except in models SICH-070 and 076B, that have a single helix. Belt and pulley drive with a removable core. The motors are mounted on tensor bases.

Casing (outdoor units)

Made of galvanised steel sheeting, finished with oven-polymerised powdered paint, which allows installing outdoors.

Casing (indoor units)

Made of galvanised steel sheeting and finished with oven-polymerised powdered paint. Insulated internally so as to avoid condensation and reduce noise level. Equipped with a tray and corresponding drain for collecting condensation from the coil. The structure of the SICH-070 to 076B indoor units allows either vertical or horizontal orientation of the fans.

Cooling circuit

Made of welded copper tubing. The units are supplied dehydrated and factory tested with regard to maximum pressure and airtightness. In the indoor units, refrigerant expansion is carried out by means of calibrated and distributor holes. In the outdoor units, thermostatic expansion and distributor valves are used. The outdoor units also include a suction accumulator, discharge muffler, high and low pressure switches and suction and discharge pressure intakes.

Electrical panel

Accessible directly from the exterior. Includes connecting strip, control board and electronic probes, power supply contactors, operating relays, transformer, heat relays and automatic switches. In compliance with European standards in force.

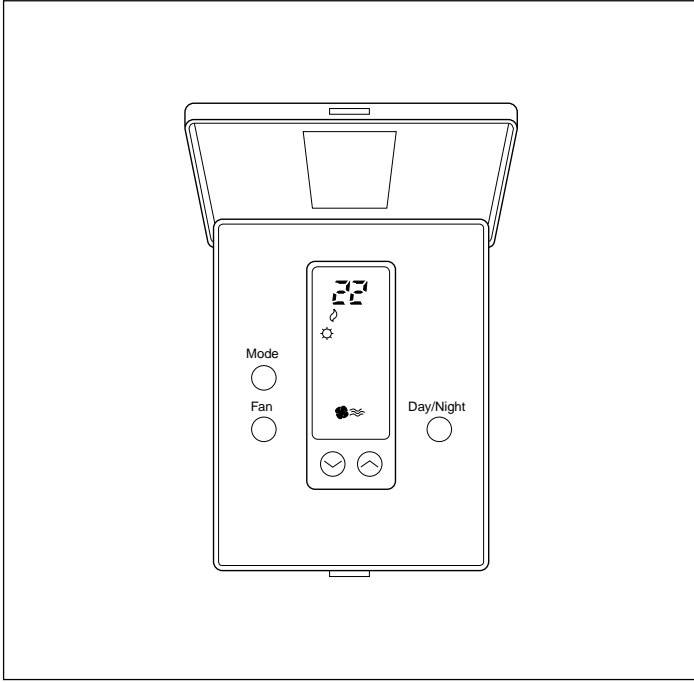
Refrigerant

These units are manufactured in refrigerant R-22 (SOH-B) and R-407 (SOH-G) versions.

Thermostat

Of the digital electronic type for heat pumps, and available with one or two stages. Designed to give a precise control of the ambient temperature and graphic information of the mode in which the heat pump is operating. This is a Proportional-

Differential-Integral response control in accordance with the difference between the programmed temperature and the ambient temperature. It varies the on-off cycles to between 3 and 7.5 cycles per hour.



Control

So as to achieve maximum energy savings and correct operation, which avoids lockouts and prolongs performance, this equipment includes the following functions:

Compressor safety

A temperature sensor protects the compressor, avoiding very high discharge temperatures.

It is also activated in the case of refrigerant leaks or insufficient air flow through the coil acting as the condensing unit.

Another temperature sensor protects the compressor by avoiding very low suction temperatures in the cool cycle.

A set of high and low pressure switches turns the compressor off when the discharge pressure is very high, or the suction pressure is very low.

There is also a third temperature sensor (SOH-076 to 120B/G) that is mounted on the indoor coil so as to avoid freezing in cool operation. The heat mode does not allow indoor fan operation until coil temperature is above 35°C.

Defrost control

The defrost cycle will begin after a certain period of time, programmable at will between 30, 60 and 90 minutes, after start-up or the last defrost cycle and evaporating temperature is below -3°C.

Start timer

Eliminates continuous on/off operations. After the unit is turned off, it will not restart until after 2 or 5 minutes, adjustable at will.

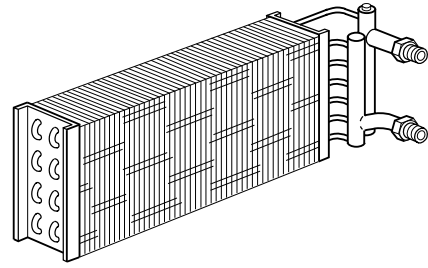
Operation at -20°C

When the outdoor temperature is below -20°C, operation of the compressor is not justified due to the low amount of heat generated by the system.

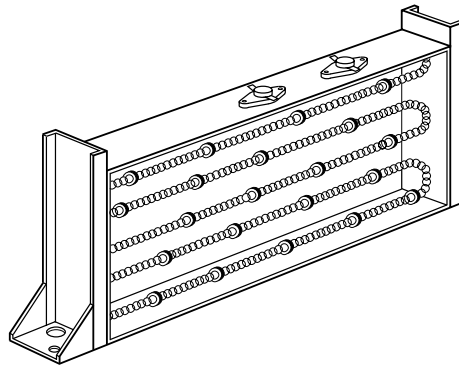
The electronic module of the unit detects this low temperature and activates automatically. It turns the compressor off and connects the auxiliary heater (if installed).

Accessories

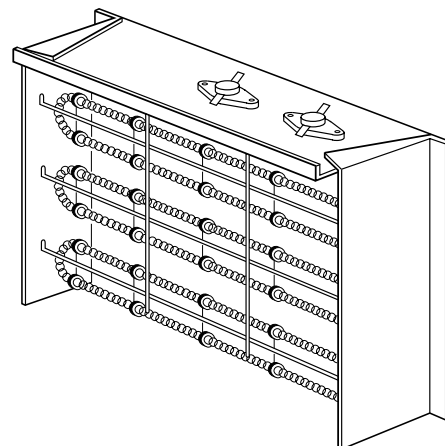
The SICH indoor units are equipped for the installation of water coils or electric heaters for supplying auxiliary heat.



Heat coil for hot water for SICH-070B-076B, 090B-120B and 150B



Inner electric heater for SICH-180B



Inner electric heater for SICH-070B-076B, 090B-120B and 150B

Physical data

Outdoor units

Model		SOH-076B/G	SOH-090B/G	SOH-120B/G	SOH-152B/G	SOH-180B/G	SOH-240B/G	
Compressor	Amount	1	1	1	2	2	2	
	Type	SOH-B Alternative SOH-G Scroll						
	Power rating	kW	8.32	11.2	13.8	2 x 8.32	2 x 11.2	2 x 13.8
	Power supply	V.ph.Hz	230.3.50 ou 400.3.50					
Fan	Power rating	W	370	370	370	370	370	370
	Number of fans		1	1	2	2	2	4
	Power supply	V.ph.Hz.	230.1.50					
	Diameter propellers		610	610	610	610	610	610
Coil	Amount		1	1	2	2	2	2
	Tubing depth x height		3 x 36	3 x 42	2 x 42	3 x 42	3 x 44	3 x 42
	Diameter tubing		3/8"	3/8"	3/8"	3/8"	3/8"	3/8"
	Surface	m ²	1.86	2.17	1.57 x 2	1.57 x 2	1.82 x 2	2.17 x 2
Dimensions with standard packing	Height	mm	1 005	1 155	1 155	1 155	1 210	1 155
	Width	mm	1 240	1 240	1 240	1 240	1 240	1 975
	Depth	mm	880	880	1 630	1 630	1 630	1 630
Gross	Nett SOH-B/SOH-G	kg	216/240	232/254	308/332	404/452	432/480	556/612
	Gross SOH-B/SOH-G	kg	220/244	236/260	314/336	410/458	438/486	562/618

Indoor units

Model		SICH-070-076B	SICH-090-120B	SICH-150B	SICH-180B	SICH-240B	
Fan	Motor power rating	W	750	1 472	1 472	3 000	3 000
	Power supply	V.ph.Hz	230.3.50 or 400.3.50				
	Motor rpm		1400	1400	1400	1 400	1400
	Number of turbines		1	2	2	2	2
	Turbine Ø	mm	320	320	320	320	380
	Turbine width	mm	320	240	320	320	380
Coil	Amount		1	1	1	1	1
	Tubing depth x height		4 x 21	4 x 25	4 x 25	4 x 29	4 x 33
	Diameter tubing		3/8"	3/8"	3/8"	3/8"	3/8"
	Surface	m ²	0.57	0.83	1.11	1.42	1.72
Dimensions with packing	Height	mm	760	833	883	935	1 025
	Width	mm	1 444	1 825	2 125	2 390	2 450
	Depth	mm	930	930	930	955	973
Weight	Nett	kg	120	165	195	240	337
	Gross	kg	132	180	212	260	360

Limits of use

Voltage limits				Air intake temperature to the outdoor coil DB				Air intake temperature to the indoor coil			
Nom. 230 V		Nom. 400V		Operating cycle				Operating cycle			
Minimum	Maximum	Minimum	Maximum	Minimum °C		Maximum °C		Minimum °C		Maximum °C	
Minimum	Maximum	Minimum	Maximum	Froid	Chaud	Froid	Chaud	Froid WB	Chaud DB	Froid WB	Chaud DB
198	254	342	436	2	-20 ⁽¹⁾	46	24	14	10 ⁽²⁾	22	25

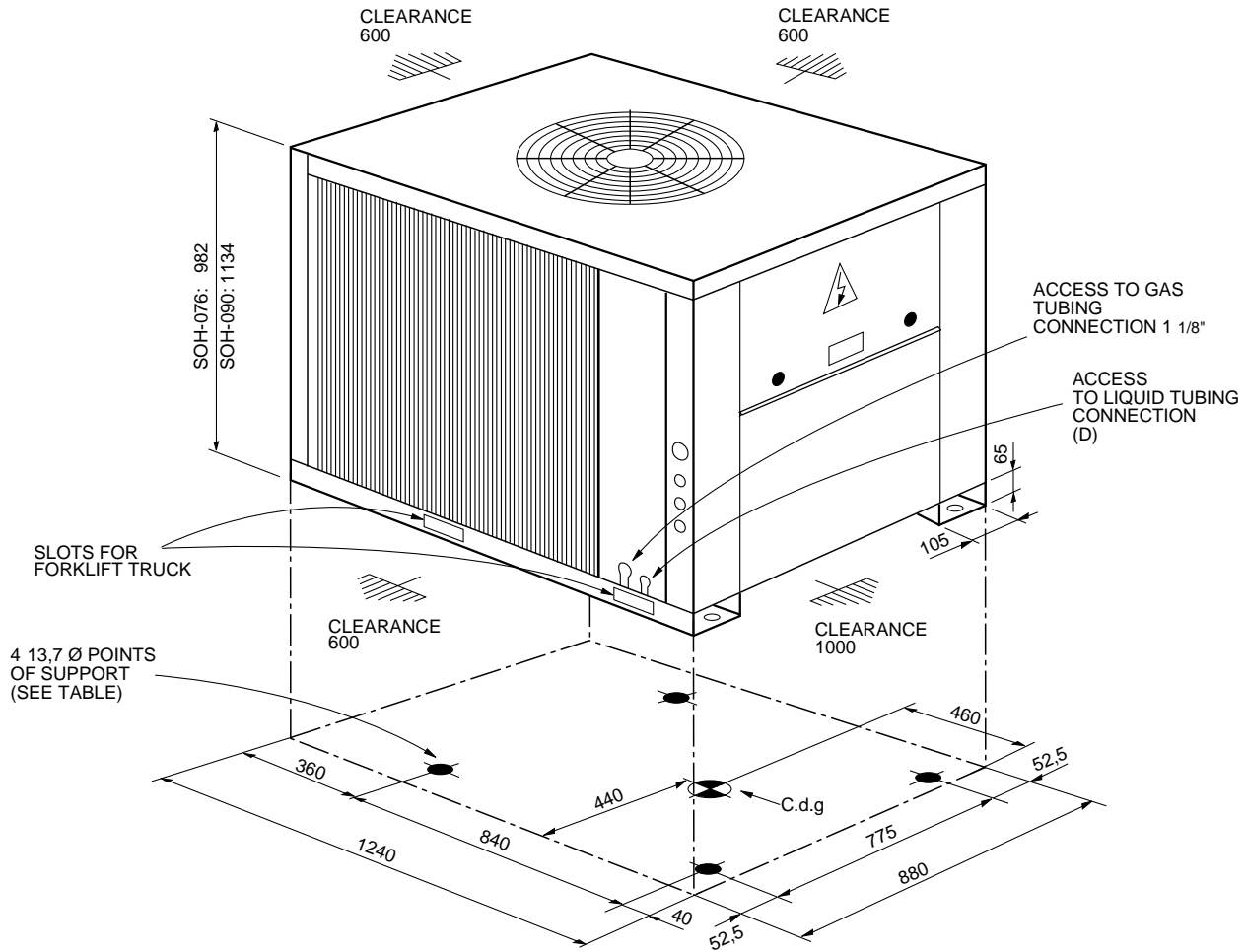
Notes: WB = wet bulb. DB = dry bulb.

(1) At below -20°C, only the emergency heater remains operative.

(2) This equipment can operate, for short intervals, at temperatures below 10°C so as to raise the conditioned air temperature to 10°C.

General dimensions mm.

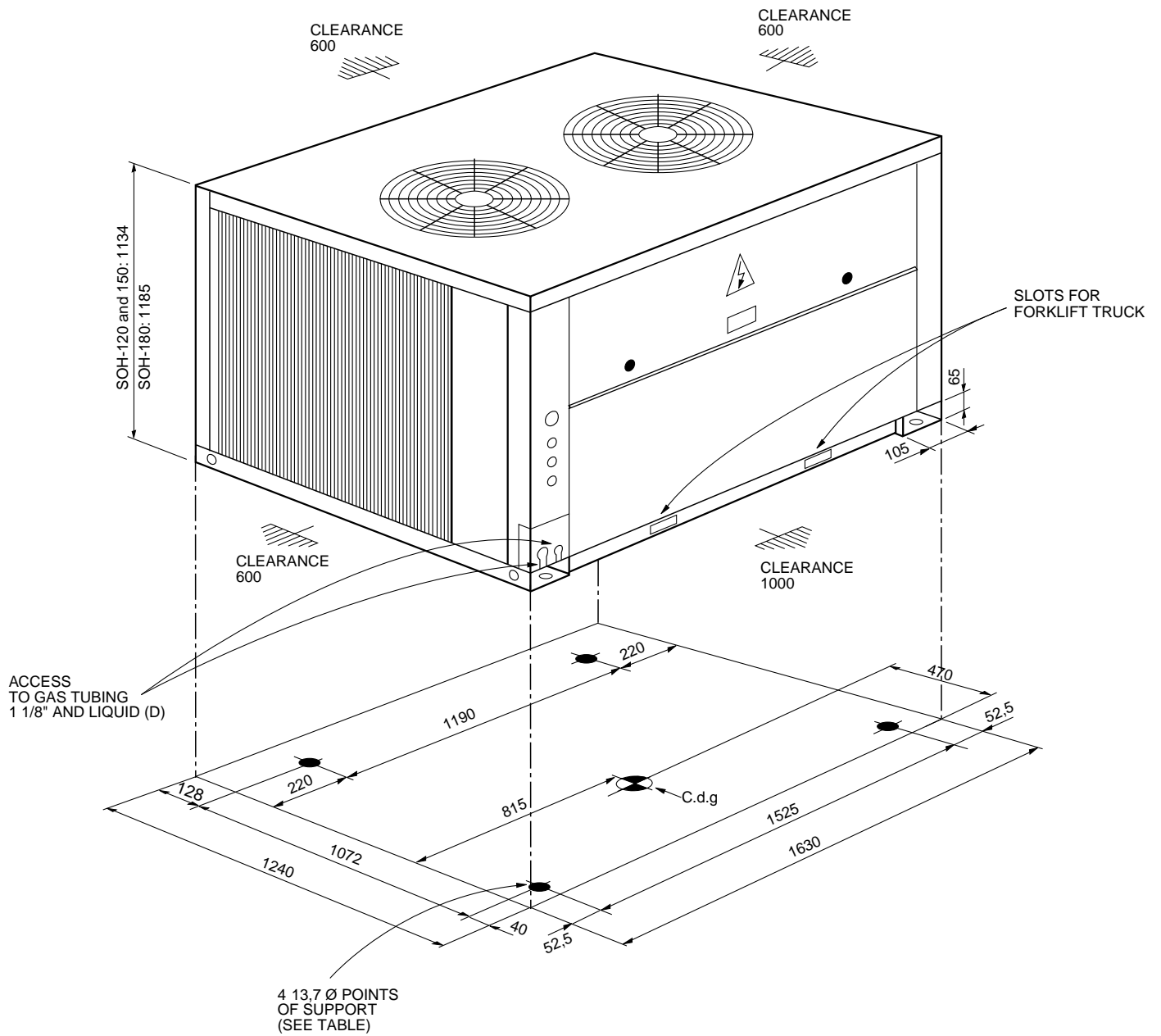
SOH-076 and 090, B/G



Unit	(D) Liquid tubing diameter	Weight kgs. per point of support
076B/G	1/2"	54/60
090B/G	5/8"	58/64

General dimensions mm.

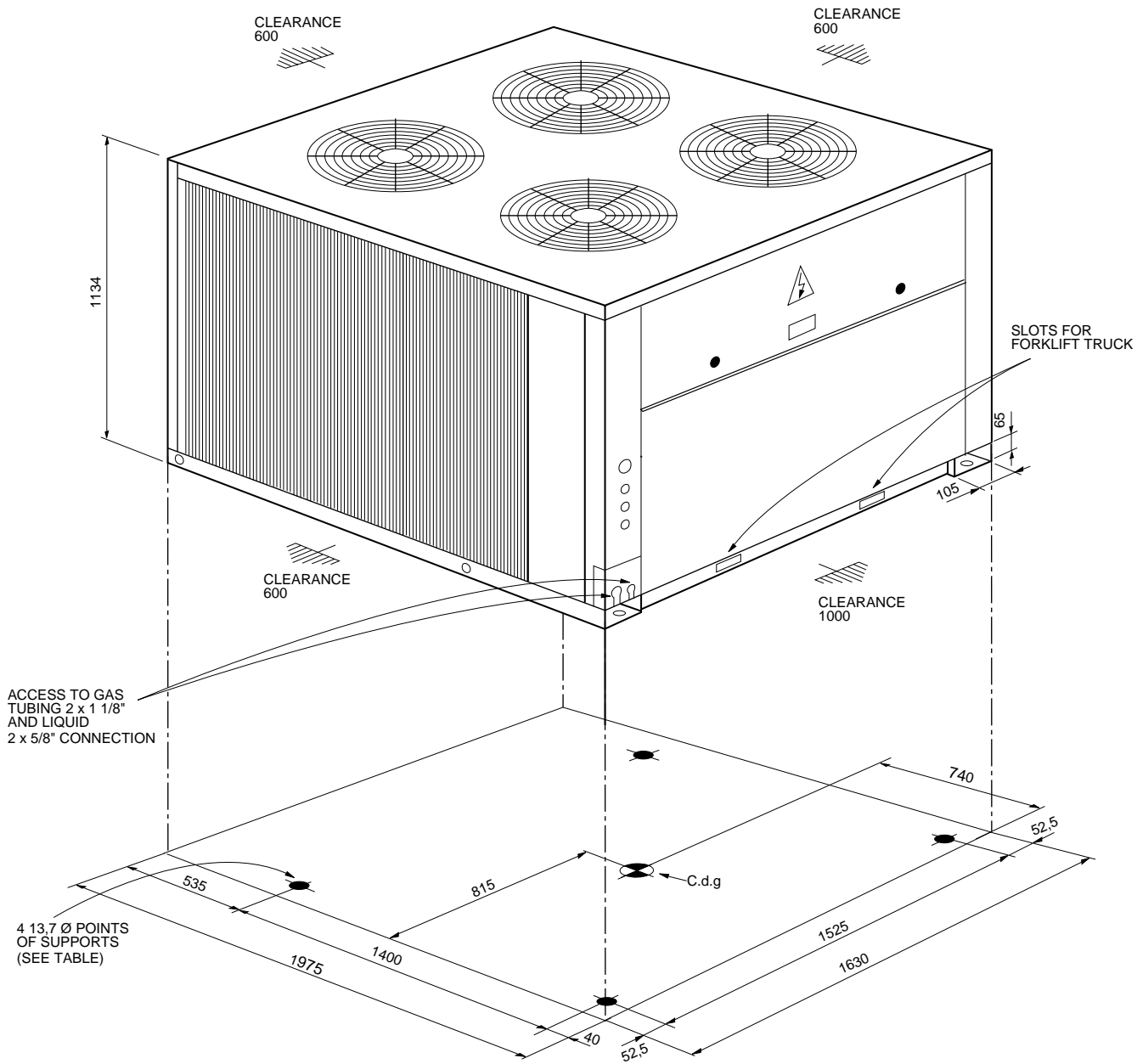
SOH-120, 150 and 180, B/G



Unit	(D) Liquid tubing diameter	Weight kgs. per point of support
120B/G	1 x 5/8"	77/83
150B/G	2 x 1/2"	101/113
180B/G	2 x 5/8"	108/120

General dimensions mm.

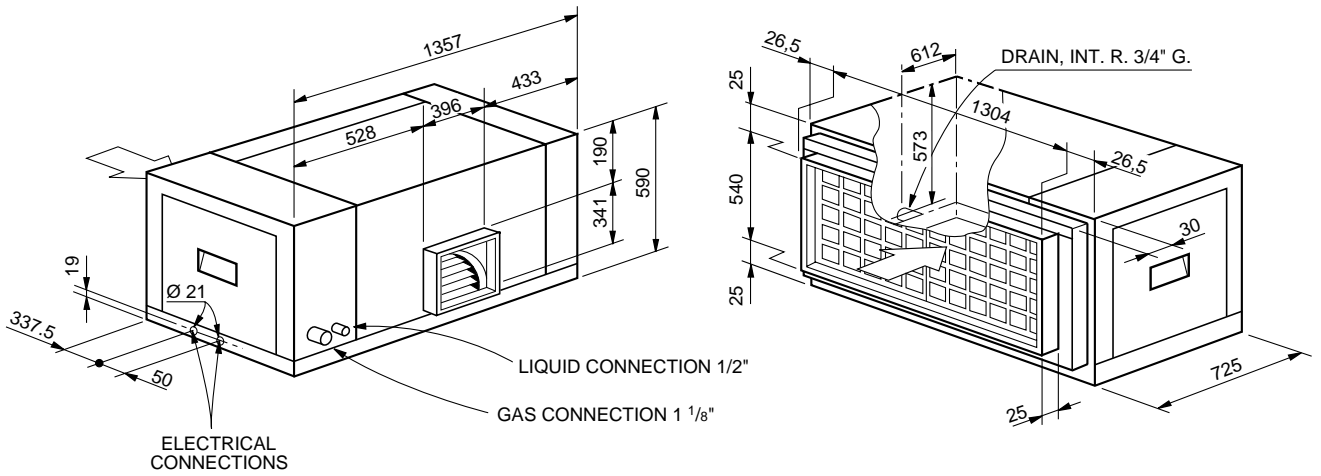
SOH-240, B/G



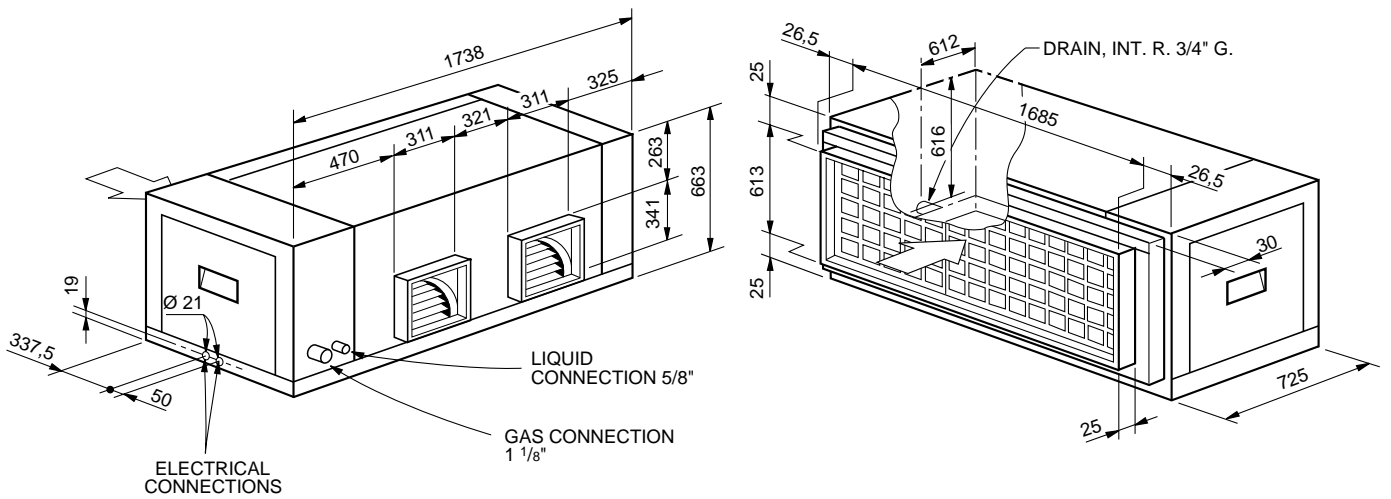
Unité	Weight kgs. per point of support
240B/G	139/153

General dimensions mm.

SICH-070 and 076B

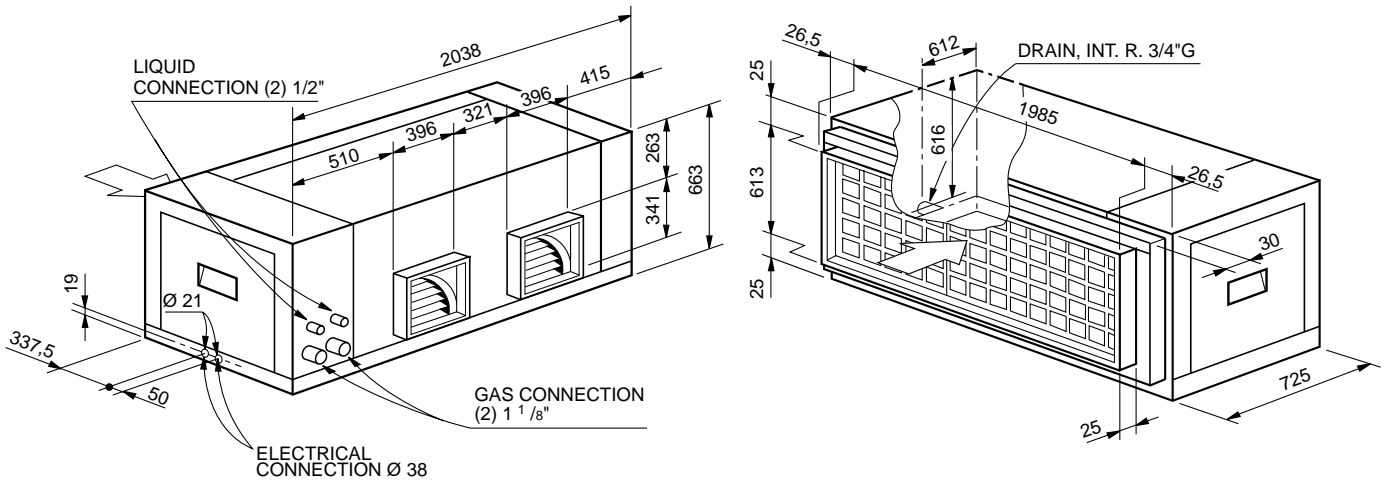


SICH-090 and 120B

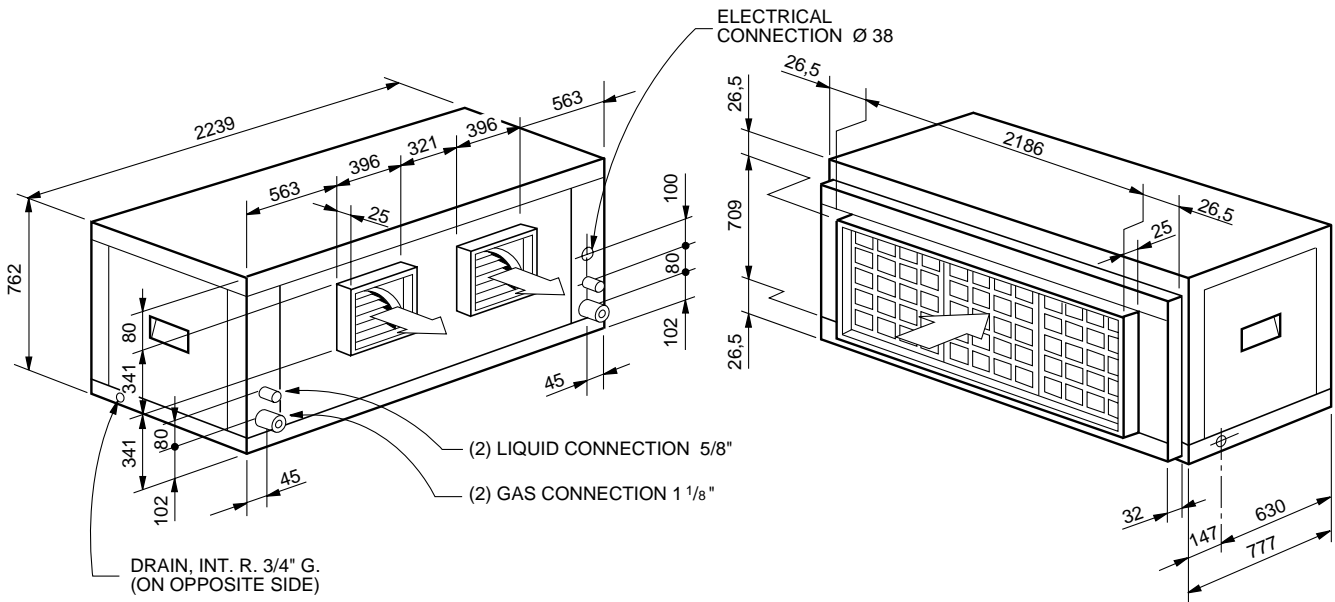


General dimensions mm.

SICH-150

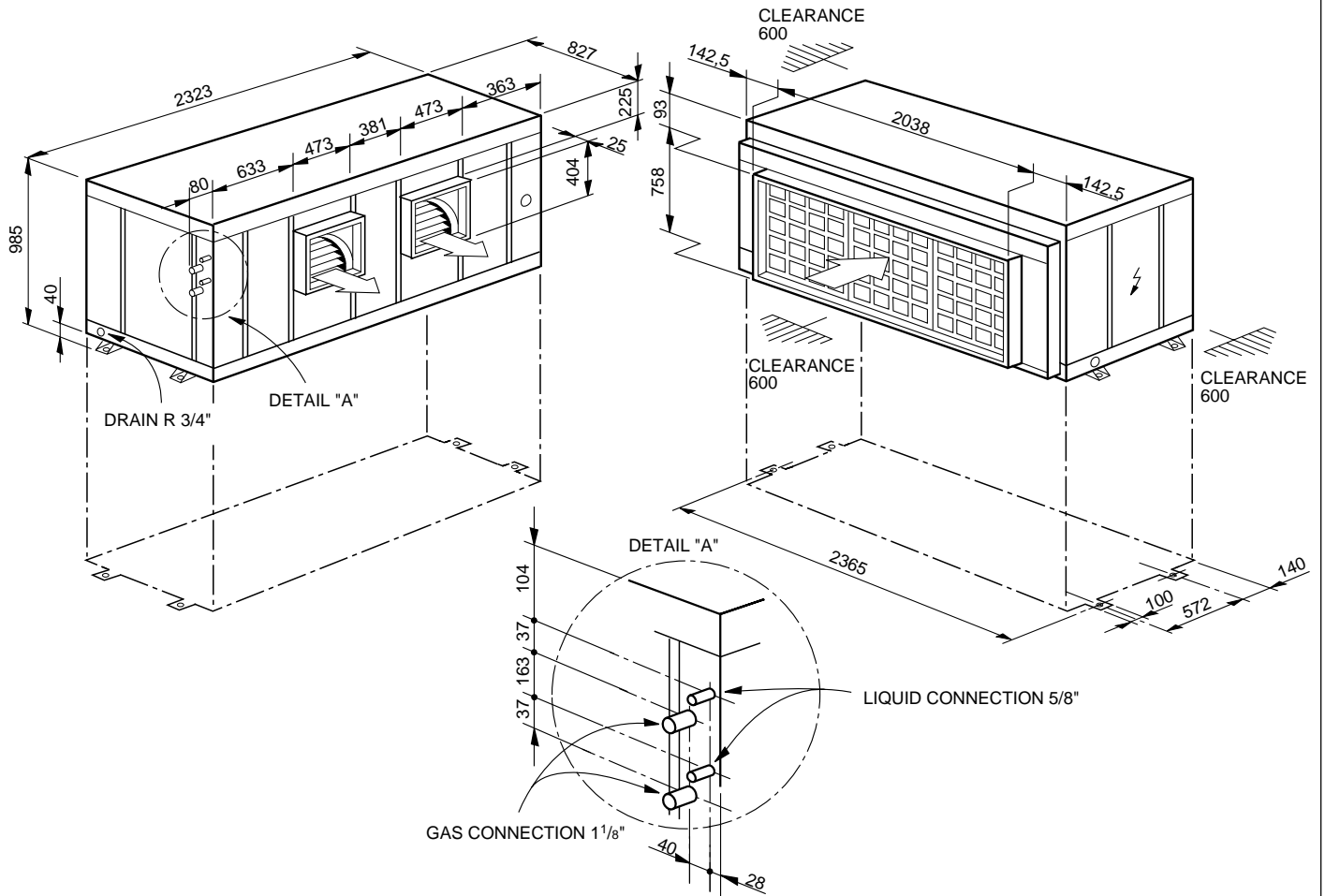


SICH-180B

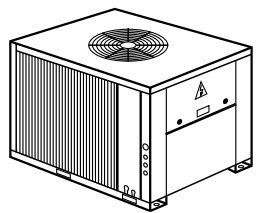


General dimensions mm.

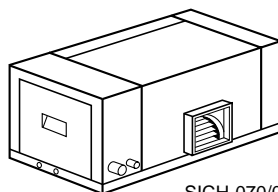
SICH-240B



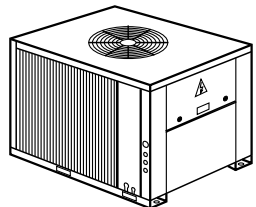
Variant chart



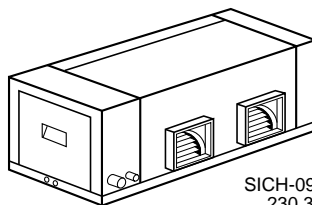
SOH-076B/G
230.3.50
400.3.50



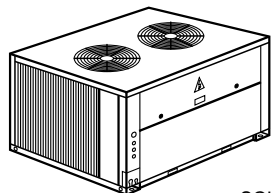
SICH-070/076B
230.3.50
400.3.50



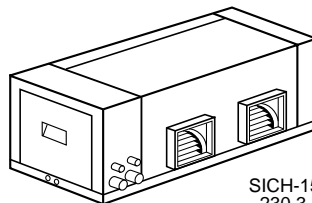
SOH-090B/G
230.3.50
400.3.50



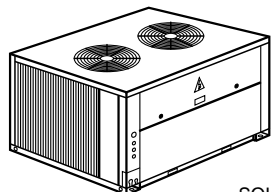
SICH-090/120
230.3.50
400.3.50



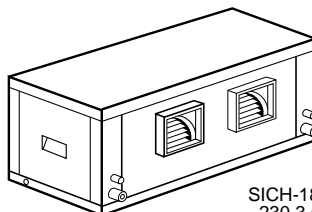
SOH-120B/G
230.3.50
400.3.50



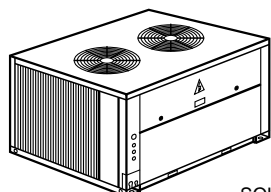
SICH-150B
230.3.50
400.3.50



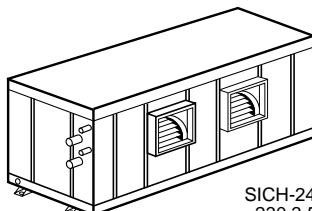
SOH-150B/G
230.3.50
400.3.50



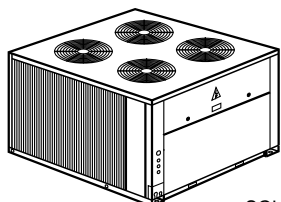
SICH-180B
230.3.50
400.3.50



SOH-180B/G
230.3.50
400.3.50



SICH-240B
230.3.50
400.3.50



SOH-240B/G
230.3.50
400.3.50

Nominal characteristics

Outdoor unit	Indoor unit	Summer		Winter	
		Cooling capacity W	Consumption W	Heating capacity W	Consumption W
SOH-076B/G	SICH-070/076B	21 000	9 590	23 000	8 570
SOH-090B/G	SICH-090/120B	28 000	12 670	28 500	9 970
SOH-120B/G	SICH-090/120B	33 000	15 640	34 000	14 240
SOH-150B/G	SICH-150B	41 800	18 900	43 000	16 665
SOH-180B/G	SICH-180B	54 000	25 690	55 000	21 650
SOH-240B/G	SICH-240B	67 000	31 280	66 000	25 980

Correcting factors

Correcting factors of the cooling capacities

Cooling capacity correcting factors for flows that vary from the nominal flows in the indoor coil.

Flow %	80	90	100	110	120	130
Total capacity	0.960	0.980	1	1.016	1.032	1.046
Sensible capacity	0.945	0.973	1	1.038	1.075	1.118
Comp. absorbed power	0.980	0.990	1	1.009	1.017	1.025

Correction of the real temperature of air intake to the outdoor coil for flows that vary from the nominal flows.

% Flow	70	80	90	100	110	120	130
Correction in °C on real temperature of air intake to the outdoor coil	5	3	1.5	0	-1	-2	-2.5

Correcting factors for heating capacities

DB air intake temperature indoor unit °C	WB air temperature outdoor unit °C				
	14	10	6	0	-8
23	1.20	1.04	0.96	0.77	0.58
20	1.25	1.10	1.00	0.80	0.69
17	1.30	1.13	1.04	0.83	0.63

Correction of the real temperature of the air intake to the outdoor unit for flows that vary from the nominal flows.

Flow %	70	80	90	100	110	120	130
Correction in °C on real temperature of air intake to the outdoor coil	-2	-1.5	-0.5	0	0.5	1	1.2

Sensible cooling capacities

Model	Dry outdoor air temperature °C (DB)	Humid air intake temperature °C (WB)	Total capacity	Sensible capacity (W/h)				Compressor absorbed power
				Dry air intake temperature to the coil °C (DB)				
				22	24	27	29	
			W/h	W/h	W/h	W/h	W/h	kW
SOH-076B/G SICH-076B	25	22	25 200	7 671	10 579	14 942	17 855	6,99
		19,5	22 680	11 297	14 206	18 569	21 482	7,32
		17	21 000	15 165	18 074	21 000	21 000	7,65
	35	22	23 310	7 028	9 936	14 299	17 208	7,90
		19,5	21 000	10 673	13 582	17 945	20 853	8,32
		17	19 320	13 642	16 551	19 320	19 320	8,74
	45	22	21 000	6 313	9 221	13 584	16 493	9,15
		19,5	18 900	9 962	12 870	17 233	18 900	9,57
	17	17 220	13 640	16 548	17 220	17 220	9,98	

Sensible cooling capacities

Model	Dry outdoor air temperature °C (DB)	Humid air intake temperature °C (WB)	Total capacity	Sensible capacity (W/h)				Compressor absorbed power
				Dry air intake temperature to the coil °C (DB)				
				22	24	27	29	
			W/h	W/h	W/h	W/h	W/h	kW
SOH-090B/G SICH-090	25	22	33 600	10 027	14 608	21 480	26 067	9.41
		19.5	30 240	15 773	20 354	27 226	30 240	9.86
		17	28 000	21 833	26 414	28 000	28 000	10.30
	35	22	31 080	9 197	13 778	20 650	25 231	10.64
		19.5	28 000	14 965	19 546	26 418	28 000	11.20
		17	25 760	19 741	24 322	25 760	25 760	11.76
	45	22	28 000	8 271	12 852	19 724	24 305	12.32
		19.5	25 200	14 041	18 622	25 200	25 200	12.88
		17	22 960	19 849	22 960	22 960	22 960	13.44
SOH-120B/G SICH-120B	25	22	39 600	11 988	16 764	23 928	28 710	10.10
		19.5	35 640	17 954	22 730	29 893	34 677	10.58
		17	33 000	24 296	29 072	33 000	33 000	11.06
	35	22	36 630	10 987	15 763	22 927	27 703	11.42
		19.5	33 000	16 981	21 757	28 921	33 000	12.02
		17	30 360	21 762	26 538	30 360	30 360	12.63
	45	22	33 000	9 872	14 648	21 812	26 588	13.23
		19.5	29 700	15 871	20 647	27 811	29 700	13.83
		17	27 060	21 916	26 692	27 060	27 060	14.43
SOH-150B/G SICH-150B	25	22	50 400	15 136	21 635	31 384	37 892	6.33
		19.5	45 360	23 274	29 773	39 522	45 360	6.63
		17	42 000	31 886	38 385	42 000	42 000	6.93
	35	22	46 620	13 878	20 378	30 126	36 625	7.16
		19.5	42 000	22 051	28 550	38 299	42 000	7.53
		17	38 640	28 648	35 147	38 640	38 640	7.91
	45	22	42 000	12 477	18 976	28 725	35 224	8.29
		19.5	37 800	20 653	27 152	36 901	37 800	8.66
		17	34 440	28 887	34 440	34 440	34 440	9.04

Sensible cooling capacities

Model	Dry outdoor air temperature °C (DB)	Humid air intake temperature °C (WB)	Total capacity	Sensible capacity (W/h)				Compressor absorbed power
				Dry air intake temperature to the coil °C (DB)				
				22	24	27	29	
			W/h	W/h	W/h	W/h	W/h	kW
SOH-180B/G SICH-180B	25	22	62 400	18 683	26 948	39 346	47 622	7.83
		19.5	56 160	29 041	37 306	49 704	56 160	8.20
		17	52 000	39 983	48 248	52 000	52 000	8.57
	35	22	57 720	17 133	25 398	37 796	46 061	8.85
		19.5	52 000	27 533	35 798	48 196	52 000	9.32
		17	47 840	35 991	44 257	47 840	47 840	9.78
	45	22	52 000	15 405	23 671	36 068	44 334	10.25
		19.5	46 800	25 809	34 075	46 472	46 800	10.72
		17	42 640	36 284	42 640	42 640	42 640	11.18
SOH-240B/G SICH-240B	25	22	80 400	24 546	33 612	47 212	56 292	19.65
		19.5	72 360	35 838	44 905	58 505	67 587	20.58
		17	67 000	47 905	56 972	67 000	67 000	21.52
	35	22	74 370	22 484	31 551	45 151	54 218	22.22
		19.5	67 000	33 839	42 906	56 506	65 572	23.39
		17	61 640	42 946	52 012	61 640	61 640	24.56
	45	22	67 000	20 193	29 259	42 859	51 926	25.73
		19.5	60 300	31 560	40 627	54 227	60 300	26.90
		17	54 940	43 020	52 087	54 940	54 940	28.07

Test conditions

Voltage	Length of interconnecting tubing	Summer				Winter			
		Outdoor temp. °C		Indoor temp. °C		Outdoor temp. °C		Indoor temp. °C	
		DB	WB	DB	WB	DB	WB	DB	WB
400	7.5 meters	35	24	27	19	7	6	20	12

Nominal flows

The cooling and heating capacities of the corresponding tables are valid for the following nominal flows. For other flows, apply the correcting factors from the corresponding table.

Model	Nominal flow		Indoor fan available pressure
	m ³ /h	m ³ /s	Pa
SICH-070 and 076B	4 615	1.28	62
SICH-090 and 120B	8 060 / 7 850	2.24 / 2.18	62 / 75
SICH-150B	10 700	2.97	75
SICH-180B	13 600	3.77	80
SICH-240B	14 780	4.1	80

Indoor fan features

Model	Static pressure available		Air flow		Absorbed power W
	mm WG ⁽¹⁾	Pa	m ³ /h	m ³ /s	
SICH-070-076B	14	137.2	3 577	0.99	680
	12	117.6	3 885	1.07	740
	10	98	4 130	1.14	785
	8	78.4	4 399	1.22	840
	6	58.8	4 653	1.29	900
	5	49	4 723	1.31	920
	4	39.2	4 860	1.35	955
	2	19.6	5 058	1.40	1 005
	0	0	5 281	1.46	1 070
SICH-090-120B	17.1	167.6	5 250	1.46	650
	16.5	161.7	5 500	1.53	690
	15.2	149.0	6 000	1.66	770
	13.6	133.3	6 500	1.80	850
	11.5	112.7	7 000	1.94	950
	10.0	98.0	7 500	2.08	1 050
	6.7	65.7	8 000	2.22	1 100
	3.6	35.3	8 500	2.36	1 210
	1.0	9.8	9 000	2.50	1 320
	0.0	0.0	9 200	2.55	1 375
SICH-150B	17.9	175.4	7 000	1.94	896
	17.1	167.6	7 500	2.08	970
	16.0	156.8	8 000	2.22	1 045
	14.8	137.2	8 500	2.36	1 100
	13.3	130.3	9 000	2.50	1 175
	12.1	118.6	9 500	2.64	1 275
	10.0	98.0	10 000	2.78	1 375
	8.5	83.3	10 500	2.92	1 450
	6.5	63.7	11 000	3.05	1 600
	4.3	42.1	11 500	3.19	1 700
	2.0	19.6	12 000	3.33	1 802
	0.0	0.0	12 500	3.47	1 970
SICH-180B	15.9	155.8	11 500	3.19	2 004
	14.2	139.1	12 000	3.33	2 139
	12.6	123.4	12 500	3.47	2 240
	11.0	107.8	13 000	3.61	2 408
	8.6	84.2	13 500	3.75	2 535
	6.5	63.7	14 000	3.89	2 732
	3.9	38.2	14 500	4.02	2 843
	1.3	12.7	15 000	4.16	3 000
	0.0	0.0	15 200	4.22	3 150
SICH-240B	19.9	195	10 000	2.78	1 395
	18	176	11 000	3.05	1 550
	16.1	158	12 000	3.33	1 565
	13.4	131	13 000	3.61	1 905
	10.7	105	14 000	3.89	2 050
	7.4	73	15 000	4.16	2 240
	3.9	38	16 000	4.44	2 430

(1) Flow services with wet coil, including filters.

Electrical characteristics

Outdoor units

Model	Power supply V.ph.Hz.		Consumption A				Power supply cable section (2) mm ²	Automatic switch (K curve) (1) A
	Compressor	Fan	Compressor		Fan			
			Démarrage SOH-B/SOH-G	Nominal	Démarrage	Nominal		
SOH-076B/G	230.3.50	230.1.50	175/166	21.1	6	2.2	10	40
	400.3.50	230.1.50	86/94	12.1	6	2.2	4	25
SOH-090B/G	230.3.50	230.1.50	215/224	28.2	6	2.2	10	50
	400.3.50	230.1.50	108/127	14.7	6	2.2	6	32
SOH-120B/G	230.3.50	230.1.50	256/279	33.3	2 x 6	2 x 2.2	16	63
	400.3.50	230.1.50	129/158	19.1	2 x 6	2 x 2.2	10	40
SOH-150B/G	230.3.50	230.1.50	2 x 175/2 x 166	2 x 21.1	2 x 6	2 x 2.2	25	80
	400.3.50	230.1.50	2 x 86/2 x 94	12.1	2 x 6	2 x 2.2	10	50
SOH-180B/G	230.3.50	230.1.50	2 x 215/2 x 224	2 x 28.2	2 x 6	2 x 2.2	35	100
	400.3.50	230.1.50	2 x 108/2 x 127	2 x 14.7	2 x 6	2 x 2.2	16	63
SOH-240B/G	230.3.50	230.1.50	2 x 256/2 x 279	2 x 33.3	4 x 6	4 x 2.2	50	125
	400.3.50	230.1.50	2 x 129/2 x 158	2 x 19.1	4 x 6	4 x 2.2	25	80

Important: The dimensioning of the automatic switch and power supply line sections are orientative and should be corrected in accordance with job site conditions, length between units and legislation in force.

Notes: 1.- K curve (DIN, VDE 0660-104) 2.- Based on copper conductors.

Indoor units

Model	Power supply V.ph.Hz.	Consumption A		Power supply cable section mm ²
	Fan	Fan		
		Start	Nominal	
SICH-070/076B	230.3.50	14	3.2	4 x 1.5
	400.3.50	8	1.8	4 x 1.5
SICH-090B	230.3.50	30	5.5	4 x 1.5
	400.3.50	17.2	3.2	4 x 1.5
SICH-120B	230.3.50	30	5.8	4 x 1.5
	400.3.50	17.2	3.4	4 x 1.5
SICH-150B	230.3.50	30	5.8	4 x 1.5
	400.3.50	17.2	3.4	4 x 1.5
SICH-180B	230.3.50	59	10.8	4 x 2.5
	400.3.50	34	6.3	4 x 1.5
SICH-240B	230.3.50	59	10.8	4 x 2.5
	400.3.50	34	6.3	4 x 1.5

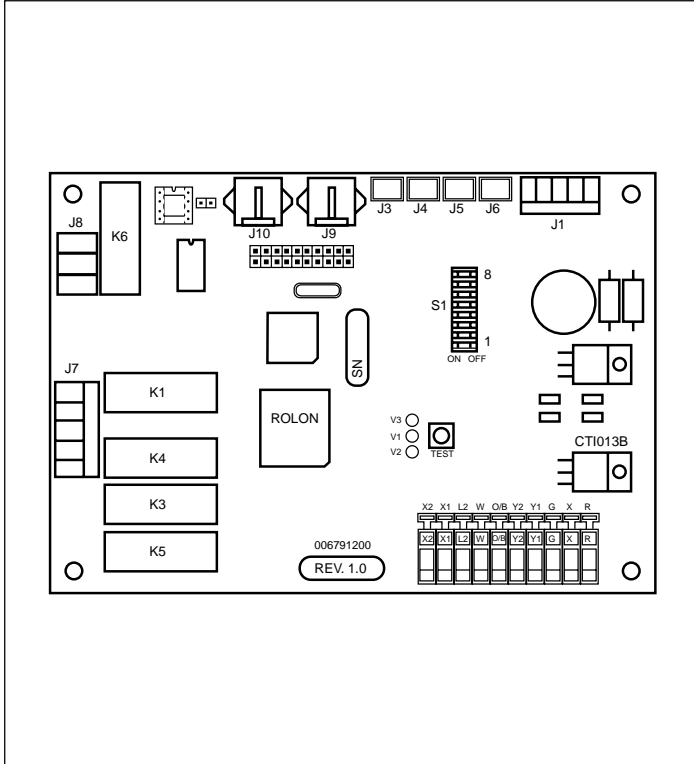
Important: The dimensioning of the automatic switch and power supply line sections are orientative and should be corrected in accordance with job site conditions, length between units and legislation in force.

Standard accessories

Accessory	Model SICH			
	070-076	090-120	150	180
Electric coil for model SICH-076B 10 kW	X			
Electric coil for model SICH-076B 15 kW	X			
Electric coil for model SICH-090B 10 kW		X		
Electric coil for model SICH-090B 20 kW		X		
Electric coil for model SICH-150B 15 kW			X	
Electric coil for model SICH-150B 30 kW			X	
Electric coil for model SICH-180B 15 kW				X
Electric coil for model SICH-180B 30 kW				X
Water coil for model SICH-076B	X			
Water coil for model SICH-090B		X		
Water coil for model SICH-150B			X	
Vertical conversion kit for model SICH-180B				X

Operation

The control board of these units is common to both the cool only as well as the heat pump units. By connecting an additional module, two-compressor equipment can be controlled. Equipment control is carried out by means of software that is resident in the board. System operation is carried out in accordance with the position of the microswitches in the main board. There are also variations in the control algorithm, depending upon the accessories the board detects installed in the equipment.



Indoor fan

Operation can be continuous or automatic. For continuous operation, select said operation on the thermostat. If the internal probe (optional accessory) is installed, and the operating mode is heat, the fan will not start until the indoor coil has reached 35°C, and will stop when this temperature drops to below 30°C. Whenever the electric heating starts, the indoor fan will also start.

Outdoor fan

The outdoor fan starts 5 seconds before the compressor. And stops after the compressor stops.

Four-way valve

When SW6 of the control board is set to ON, the four-way valve activates when the thermostat requests heat. When a defrost cycle is carried out, this valve operates inversely; that is to say, in cool.

Compressor

When signal Y1 is present, the board commands the outdoor fan to become operative, and then the compressor. The compressor, along with the outdoor fan, does not start until after a minimum off time, so as to avoid consecutive start-ups. This period of time can be set by means of microswitches SW4; ON = 2' and OFF = 5'.

In two-stage equipment, the first compressor to start up will be the one that has been less hours in operation.

The second compressor will start if a Y2 signal is received from the thermostat.

Whenever one of the compressors is to turn off, it will be the one that has been most hours in operation.

Defrost

The defrost cycle is possible only in heat pump operation. In two-stage units, simultaneous defrost of both stages is not allowed, one remaining in standby until the other one has finished.

Start-up

The following conditions should apply:

- 1) The compressor is on.
- 2) The liquid probe temperature is below -3°C for 3'.
- 3) If outdoor temperature is below 0°C, after compressor start-up 10' are timed before activating the defrost cycle.

When the defrost cycle is started, the board carries out the following operations:

- 1) Sets the 4-way valve to cool mode.
- 2) Turns the outdoor fan off.
- 3) Activates the following heat-generating phase, if the thermostat requires heat.
- 4) Turns the indoor fan off if there is no next heat stage.
- 5) Does not turn off the compressor that is defrosting, even if indicated by the thermostat.

End

This operation will last until one of the following conditions is completed:

- a) Liquid temperature above 13°C during 2".
- b) Liquid temperature above 5°C during 30".
- c) Timing period after defrost start-up over 10'.
- d) Failure signal from high pressure switch.

Once defrost is over:

- 1) Sets four-way valve to heat.
- 2) Turns outdoor fan on.
- 3) Starts indoor fan if no next heat stage exists.
- 4) Turns off heat generating phase that started due to the defrost cycle.

Test button and LEDs

The Test button shortens certain timings, resets any failure detected and also acts as a LonWorks service pin.

There are three signalling led diodes:

- a) The green led indicates correct operation of the equipment and incidents. If the equipment is operating correctly, this led flashes at a frequency of 1.6 Hz.
- b) The red led indicates failures. If no failure is present, this led remains off.
- c) The yellow led is the LonWorks service led, and also indicates, by flashing, that the operating compressor is timed.

Configuration

Each time the electronic board is powered, system configuration will be checked, with the exception of the accessories. Below we can see how the different options are configured.

Microswitches

They are read after power supply connection, and the board will act in accordance with their position. SW1 and SW2 set to OFF indicates that the configuration is carried out by remote control, and the parameters stored in the EEPROM memory are use.

Configuration of switches

The microswitches establish the following configurations:

Number	State	Meaning
1 / 2	OFF/OFF	Ignore SW, programs communications routes
	ON/OFF	Defrost period 30'
	OFF/ON	Defrost period 60'
	ON/ON	Defrost period 90'
3	ON	Discharge temperature 115°C
	OFF	Discharge temperature 130°C
4	ON	Compressor delay 2'
	OFF	Compressor delay 5'
5	ON	Cool mode
	OFF	Heat pump mode
6	ON	4-way valve active in heat
	OFF	4-way valve active in cool
7	ON	Receives signal B from thermostat (active in heat)
	OFF	Receives signal O from thermostat (active in cool)
8	ON	NA
	OFF	NA

Configuration of accessories

To carry out an accessory search and configuration, the test button should be pressed for over two seconds, until the red led goes on. Once the search and configuration process begins, the red led on the board goes on, and stays on until the operation is concluded. Once off, the board uses the accessories found.

In said search the board will also detect which optional probes are connected to the board. A incident will be give if one of the optional probes detected in the configuration process does not give valid values.

The following table shows the probe configuration.

Probe	Pump	
	Obligatory	Optional
Discharge	x	
Liquid	x	
Outdoor	x	
Suction	x	
Indoor coil		x

Installation of accessories

The accessories are used to support extended functions of the unit.

Said accessories can be either factory mounted or installed at the client's facilities. Power supply to the unit should always be disconnected. The accessory, along with the necessary elements, will then be assembled, and the power supply connected once again.

Once the search and configuration sequence is carried out, the new elements will be recognised and they will begin to operate.

The function of the different accessories is defined below.

Tray heater

A cable heater is used, mounted between the lower area of the outdoor coil and the tray, where the defrost water is collected. Its function is to avoid freezing of the water in the tray and ice in the lower area of the coil.

This heater should be activated in the winter cycle, while the compressor is operative, and when the liquid temperature is below -2°C; and deactivated when the temperature is above 2°C.

Electric heating

In the case of the heaters, the relay is used to switch the power contactor on and off, as well as the thermal switch with safety automatic reset.

In one-stage equipment, the response to a demand for first stage from the thermostat starts the compressor stage, and the second starts the electric heating.

In the case of a failure in the compressor stage, the electric heating would be activated as the first stage.

Whenever the electric heating is on, the indoor fan will also be operative.

Indoor coil probe (SOH-076 to 120B/G)

The probe in the indoor coil, depending upon the temperature, carries out the following operations:

- 1) If in heat operating mode, and the electric heater is not activated, the fan will not start until the indoor coil reaches 35°C. If the electric heating is not activated, the indoor fan will turn off if the temperature drops below 30°C. If once the compressor is operating in heat mode for 2' the indoor temperature does not reach over 35°C, an unrecoverable heat temperature incidence is indicated.
- 2) If in cool operating mode, and the probe temperature is below -25°C, or the compressor is in operation for over 5' and the temperature is below -4°C, the compressor and outdoor fan go off. After the timed period, the compressor starts again. If this is repeated 3 times in 35 minutes, a failure of repeated start-up in cool is indicated, and the compressor will not restart.

Malfunctions

There are two different types of malfunctions: incidents that do not turn the unit off, and failures or lockouts, that inactivate the unit.

Indoor fan thermal switch

Its activation turns the entire unit off, and an indoor fan thermal switch failure is indicated.

High and low pressure switch

Its activation turns the compressor and outdoor fan off. A

high or low pressure failure of the switch is indicated.

Electric heating thermal switch (accessory)

Activation turns the electric heating off and indicates an incident. If this error occurs more than 3 times in an hour, an electric heater thermal switch incident is indicated, it is inhibited, and the electric heater is turned off.

Thermostat errors

If signal Y is given without signal G, it acts as if signal G were active. An incident of signal Y1 without signal G is indicated. If signal W is given without signal G, it acts as if signal G were active. An incident of signal W without signal G is given. If signal W is given without signal B/O, it acts as if signal B/O were indicating heat mode. An incident of signal W without signal B/O is given.

Protection for defrost cycles

If 3 consecutive defrost cycles are carried out and ended in compliance with the 10' timer, an incident of repeated defrosts is indicated. This incident is deleted when a defrost cycle is ended in compliance with another condition that is not the maximum timer period.

Protection for temperature

- a) If the outdoor temperature is below -20°C, the compressor turns off. An incident of low outdoor temperature (only in heat mode) is indicated.
- b) If the discharge temperature is above SW3; ON = 115°C, OFF = 130°C, the compressor and outdoor fan turn off. An excessive discharge temperature failure is indicated.
- c) If while the compressor is on for 5', the discharge temperature does not rise above 50°C, in cool mode, or 35°C in heat mode, a low discharge temperature incident is indicated.
- d) If the suction temperature is very low, the compressor and outdoor fan turn off. If this is repeated 3 times in 35 minutes, a failure is indicated.
- e) If, in heat mode, the liquid temperature is below -25°C, the compressor and outdoor fan turn off, and a failure is indicated.

Open or short circuit of the outdoor or indoor liquid probe

An incident of the corresponding probe is indicated if the value read is below -40°C, or above 100°C. If this incident takes place in heat mode in the liquid probe, repeated defrost cycles are carried out with a maximum duration of 1'.

Open or short circuit of discharge probe

An incident of the discharge probe is indicated if its value is below -20°C, or above 150°C. If the probe is short circuited, a failure is indicated.

Signalling

Malfunction signalling is carried out at two levels. One for incidents and another for failures.

Incidents

Incidents do not turn the unit off, and are indicated by the green led on the electronic board. If there is no failure present, this led flashes at a frequency of 1 Hz.

When an incident occurs, the led flashes in three sequences. The first indicates the compressor involved: one flash for stage 1, and two for stage 2, followed by a short pause. The second

indicates the type of incident. Another short pause. The third indicates the incident detected, followed by a long pause, and the sequence is repeated again as long as the incident lasts.

The incidents reset when the cause disappears. In the case of more than once incident at the same time, only the first one detected and not reset is indicated. As they reset, the other existing incidents not reset will be indicated.

Type	Flashes		Incident
	2 nd	3 rd	
Probes	1	1	Discharge probe open or >150°C
	1	2	Liquid probe open or short circuited
	1	3	Outdoor probe open or short circuited
	1	4	Indoor probe open or short circuited
	1	5	Outdoor temperature too low
Thermostat	2	1	Signal Y1 or Y2 without signal G
	2	2	Signal W without signal B
	2	3	Signal W without signal G
	2	4	Signal Y2 without signal Y1
Electric heater	3	1	Electric heater thermal switch AUX1
	3	2	Electric heater thermal switch AUX2
	3	3	Electric heater thermal switch EM1
	3	4	Electric heater thermal switch EM2
Temperature	4	1	Repeated defrost cycles
	4	2	Discharge temperature does not recover
	4	4	Temperature in heat does not recover
Others	5	1	ID of transceiver unknown
	5	2	Accessory disappeared

Failures (lockouts)

Failures or lockouts turn the unit off.

They are indicated by the red led on the board, and by means of the thermostat (depending upon the model). Relay K6 of the board is also activated with a 24 VAC signal between terminals LED2 and B of J2. If no failure is present, this led remains off. When a failure takes place, this led flashes in two sequences. The first indicates the compressor involved: one flash for stage 1 and two for stage 2, followed by a short pause. Then the detected failure is indicated, followed by a long pause and the sequence is repeated.

Should more than one alarm take place, only the first one

detected and not reset is indicated.

The following table shows the possible failures:

Flashes	Meaning
1	Discharge temperature surpassed or probe short circuited
2	High pressure switch
3	Low pressure switch
4	Indoor or outdoor fan thermal switch
5	Repeated start-ups in cool
6	Low liquid temperature

Reset

The incidents, with a few exceptions, do not need to be reset. They reset automatically once the cause has disappeared.

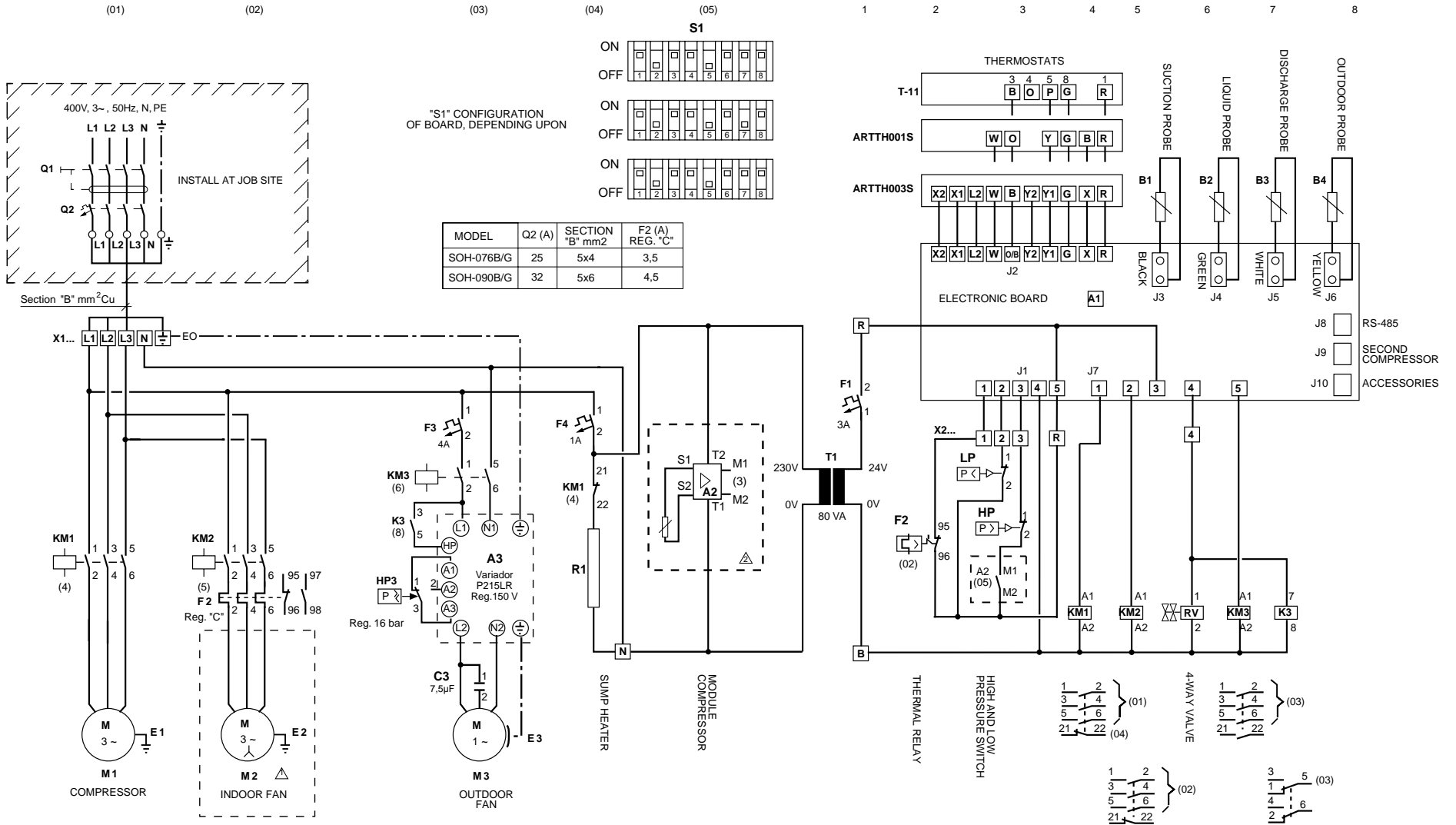
The following incidents require resetting, and are reset in the same way as the alarms:

- a) Accessory disappeared.
- b) Repeated defrost cycles (also reset if a defrost cycle ends under normal conditions).
- c) Electric heating thermal switch.

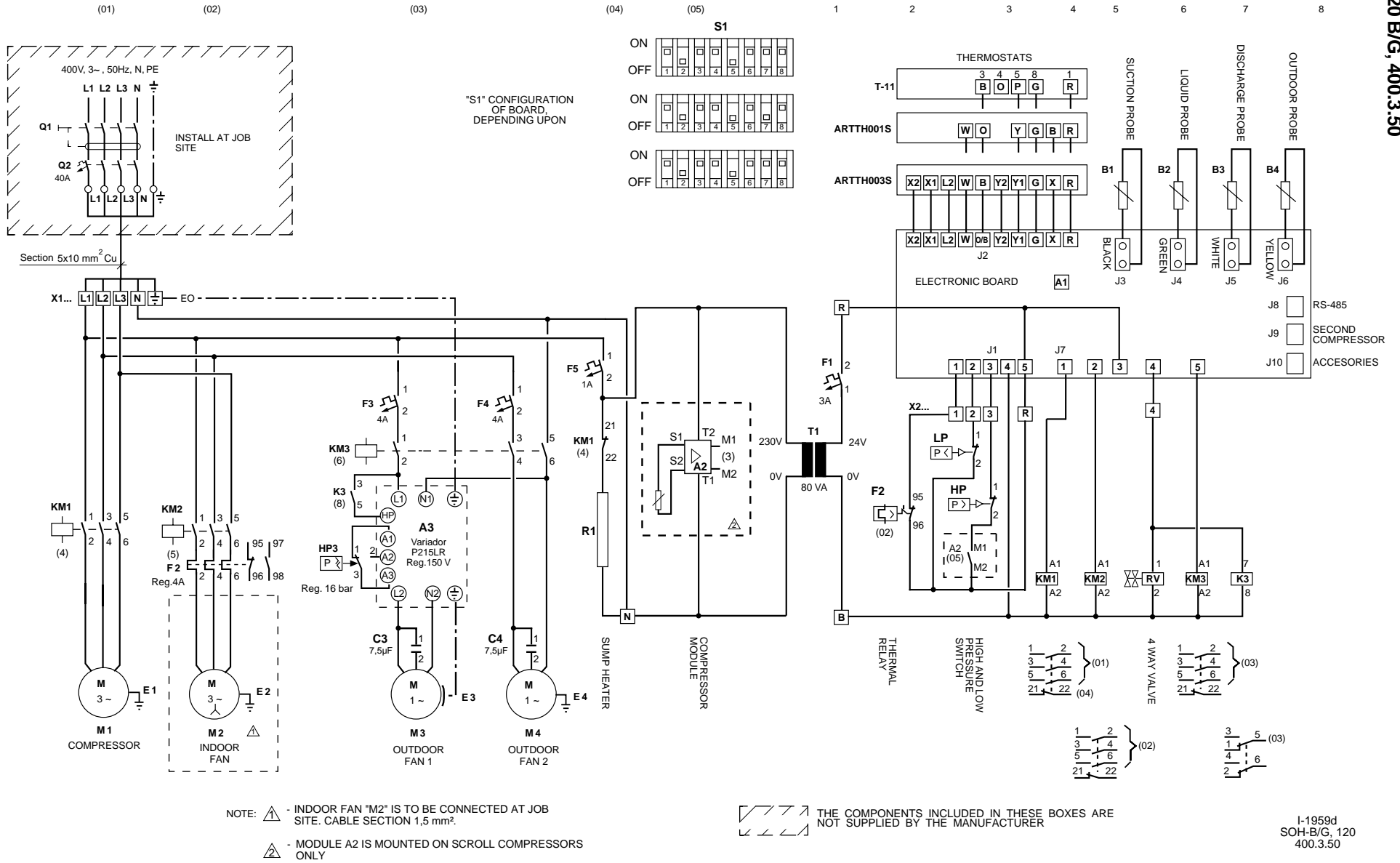
These alarms can be reset as follows:

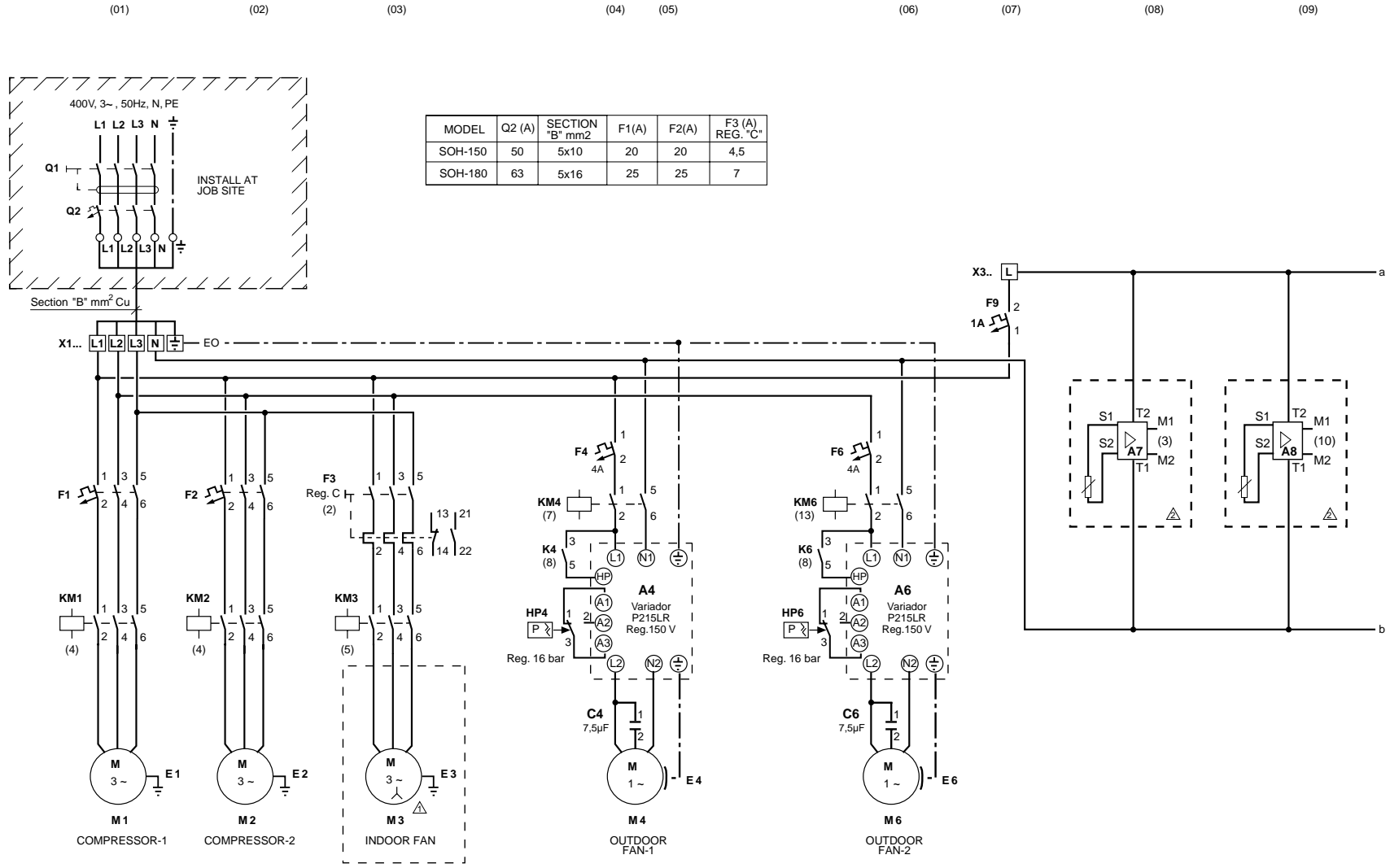
- 1) Setting the thermostat to OFF, if communication with the thermostat has been implemented.
- 2) Pressing the reset button on the electronic board.
- 3) Disconnecting and reconnecting power supply to the electronic board.
- 4) By means of the communications trunk.

It is worth pointing out that, with a reset by means of setting the thermostat to OFF, the board cannot be reset more than 3 times a day.



I-1998d
SOH-B/G, 076, 090
400.3.50



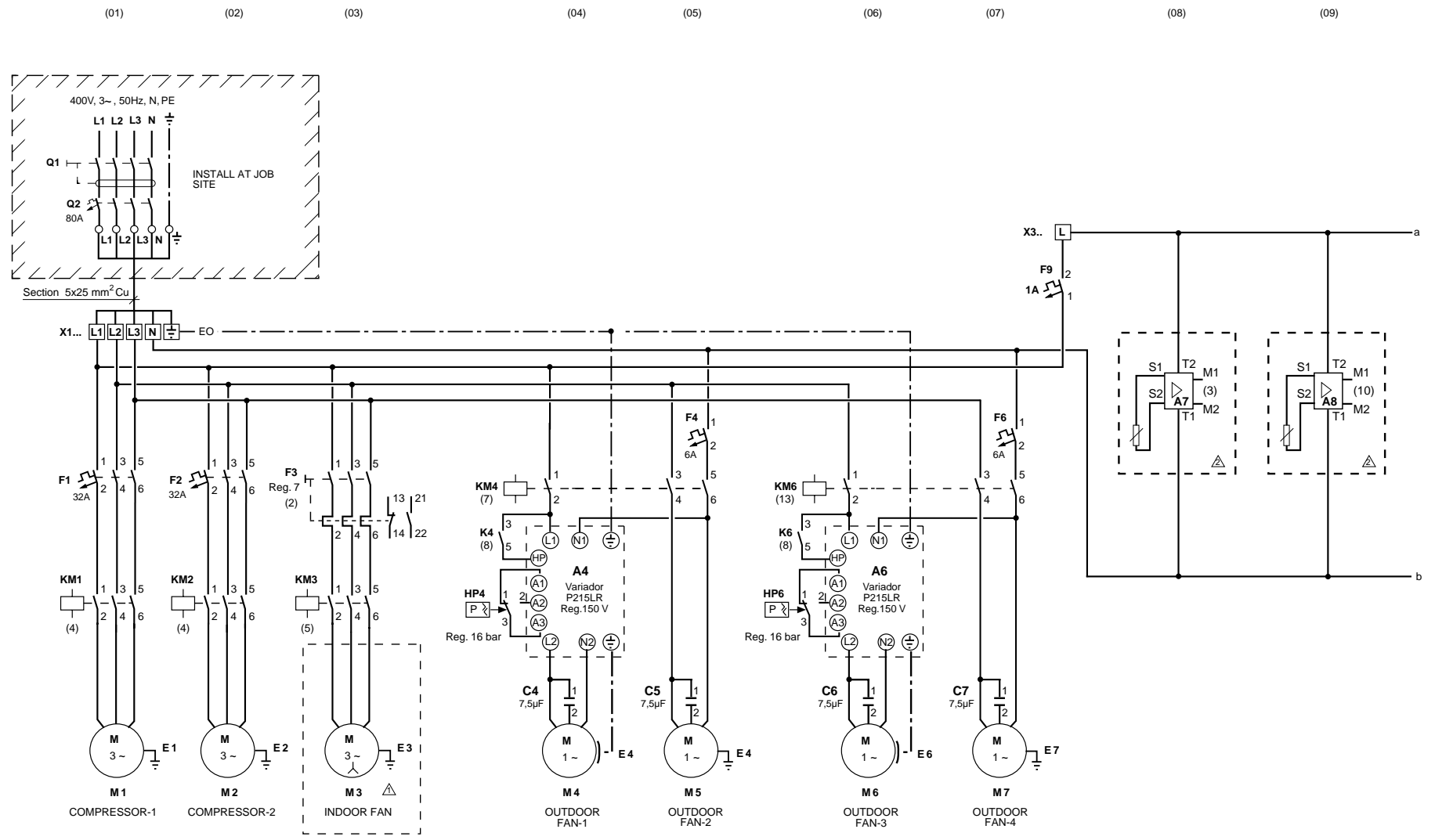


NOTE: - INDOOR FAN "M2" IS TO BE CONNECTED AT JOB SITE. CABLE SECTION 1,5 mm².

- PROTECTION MODULES A7 AND A8 ARE MOUNTED ON SCROLL COMPRESSORS ONLY

THE COMPONENTS INCLUDED IN THESE BOXES ARE NOT SUPPLIED BY THE MANUFACTURER

I-1986-1d
SOH-B/G, 150, 180
400.3.50



NOTE: - INDOOR FAN "M3" IS TO BE CONNECTED AT JOB SITE. CABLE SECTION 1,5 mm².
 - PROTECTION MODULES A7 AND A8 ARE MOUNTED ON SCROLL COMPRESSORS ONLY

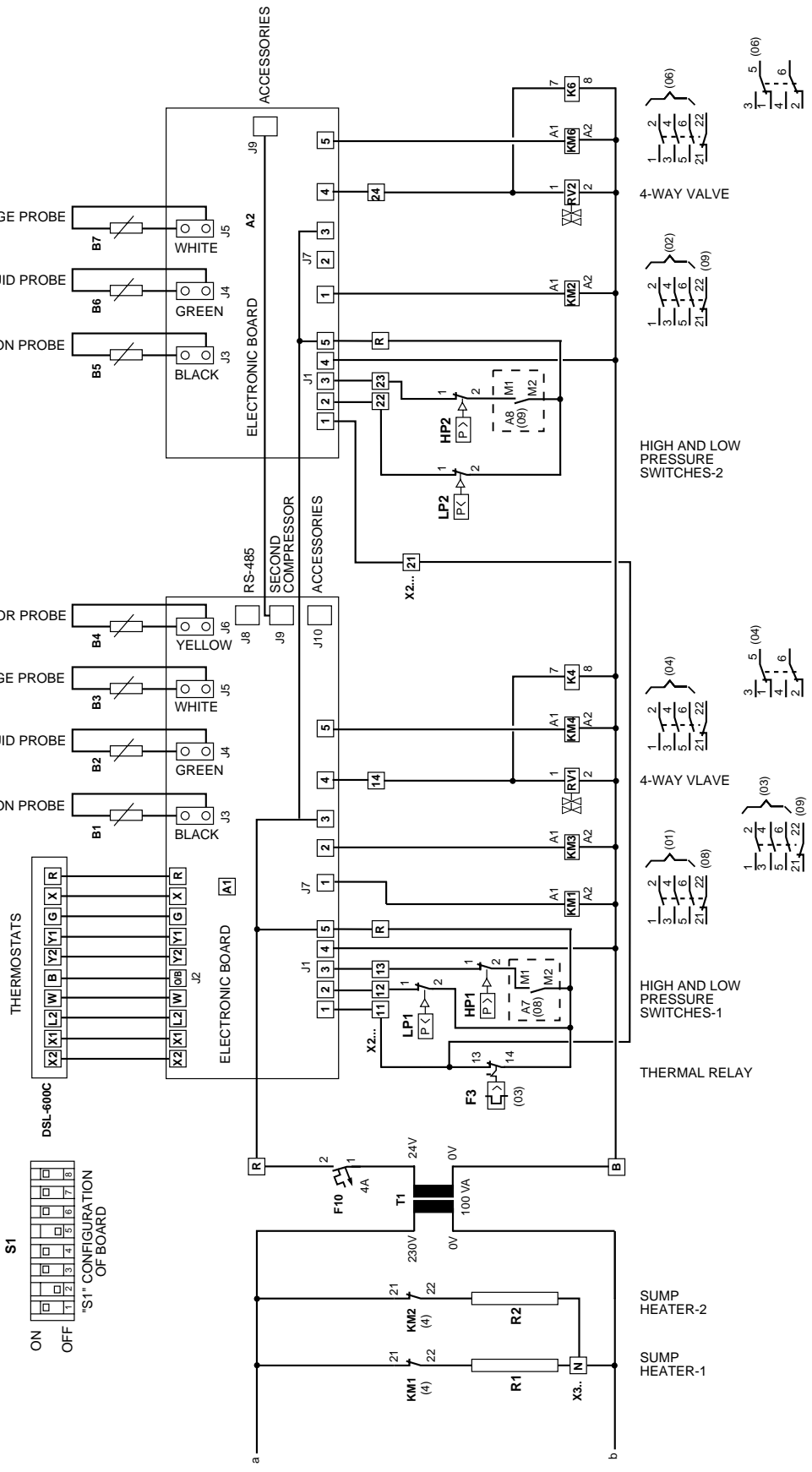
THE COMPONENTS INCLUDED IN THESE BOXES ARE NOT SUPPLIED BY THE MANUFACTURER

I-1986-2d
 SOH-B/G, 240
 400.3.50

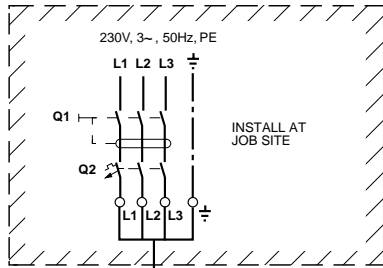
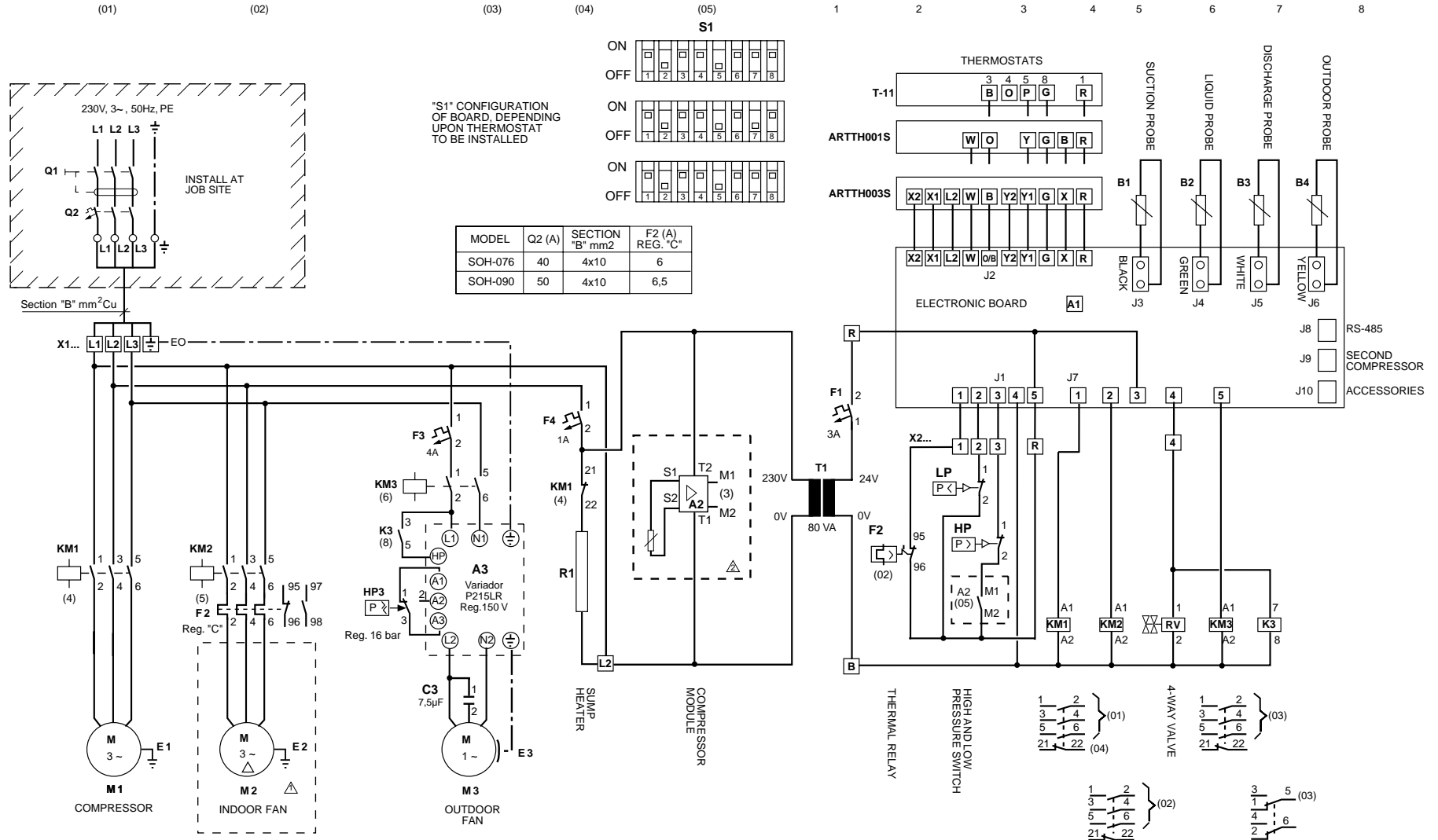
Wiring diagram

SOH-150, 180 and 240 B/G, 400.3.50

(08) 1 2 3 4 5 6 7 8 9 10 11 12 13 14

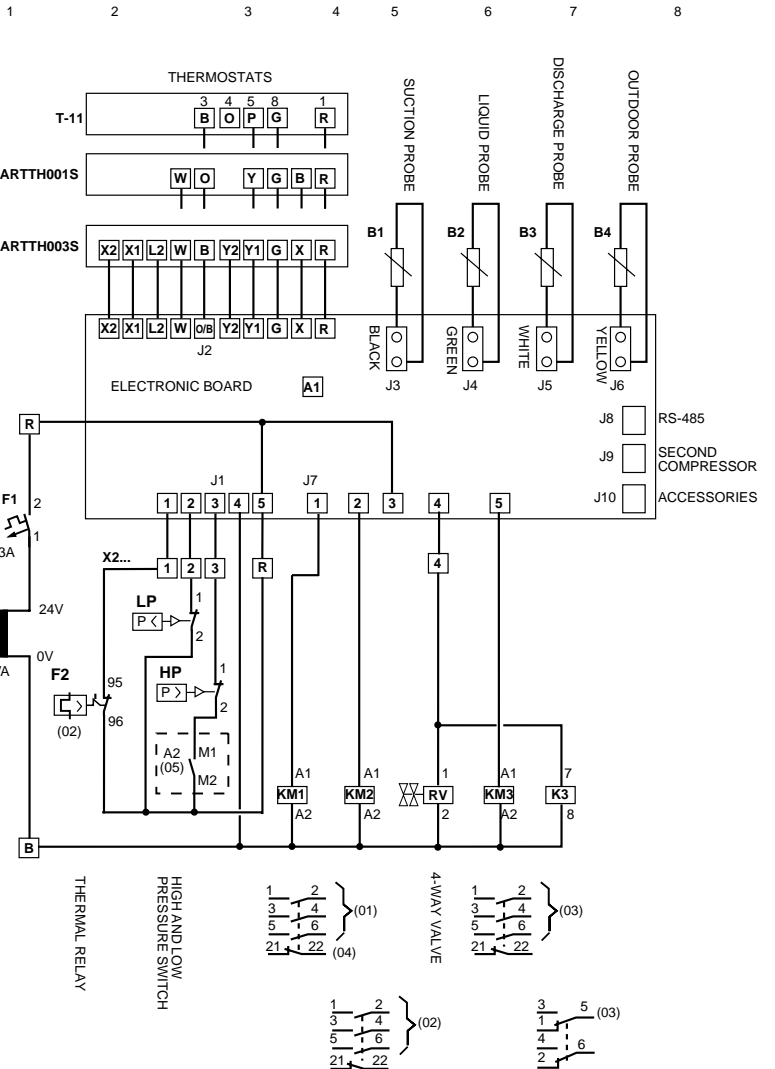
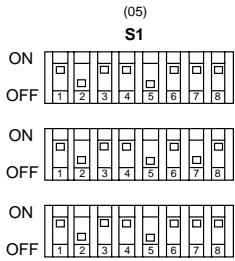


I-1986-3d
SOH-B/G, 150, 180, 240
400.3.50



"S1" CONFIGURATION OF BOARD, DEPENDING UPON THERMOSTAT TO BE INSTALLED

MODEL	Q2 (A)	SECTION "B" mm ² Cu	F2 (A) REG. °C*
SOH-076	40	4x10	6
SOH-090	50	4x10	6,5

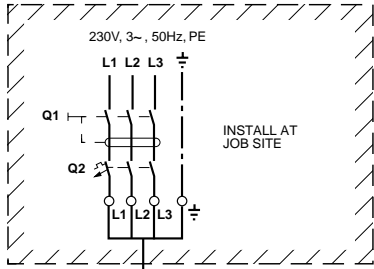


NOTE: - INDOOR FAN "M2" IS TO BE CONNECTED AT JOB SITE. CABLAGÉ SECTION 1,5 mm².
 - MODULE A2 IS MOUNTED ON SCROLL COMPRESSORS ONLY

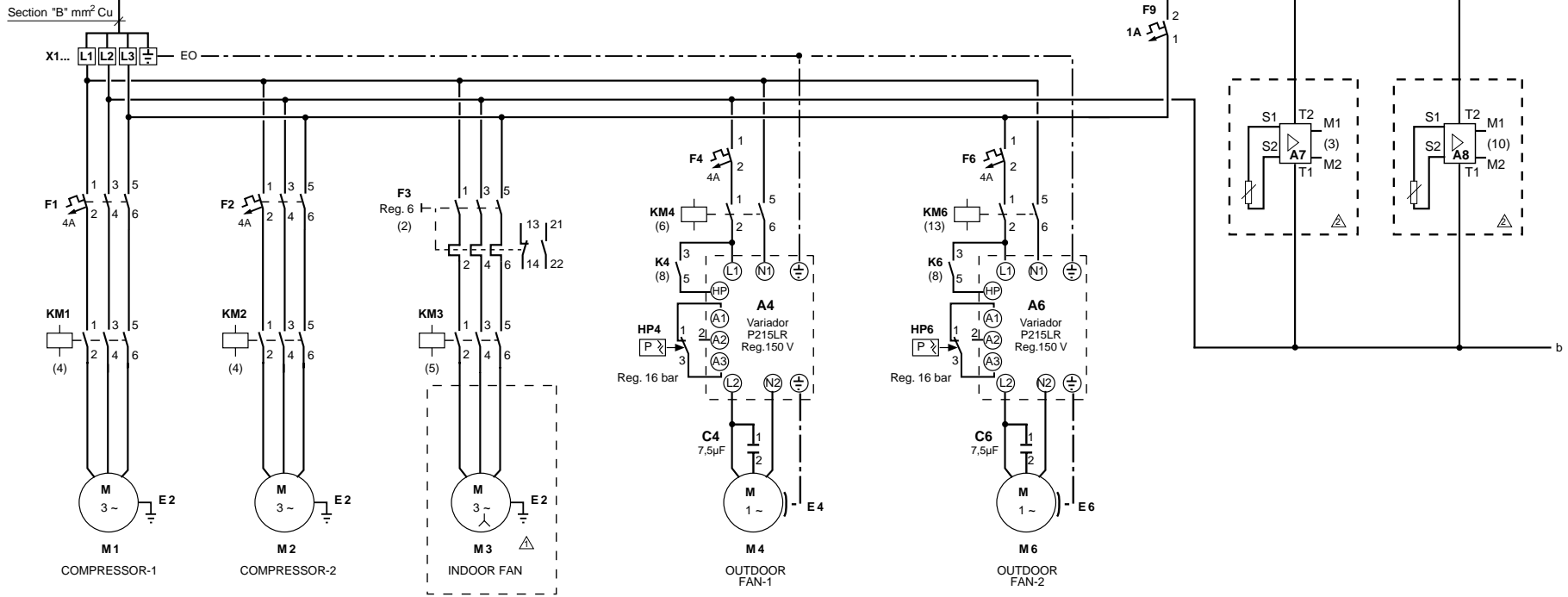
THE COMPONENTS INCLUDED IN THESE BOXES ARE NOT SUPPLIED BY THE MANUFACTURER

I-1997d
AHO-B/BG, 202, 302
230.3.50

(01) (02) (03) (04) (05) (06) (07) (08) (09)



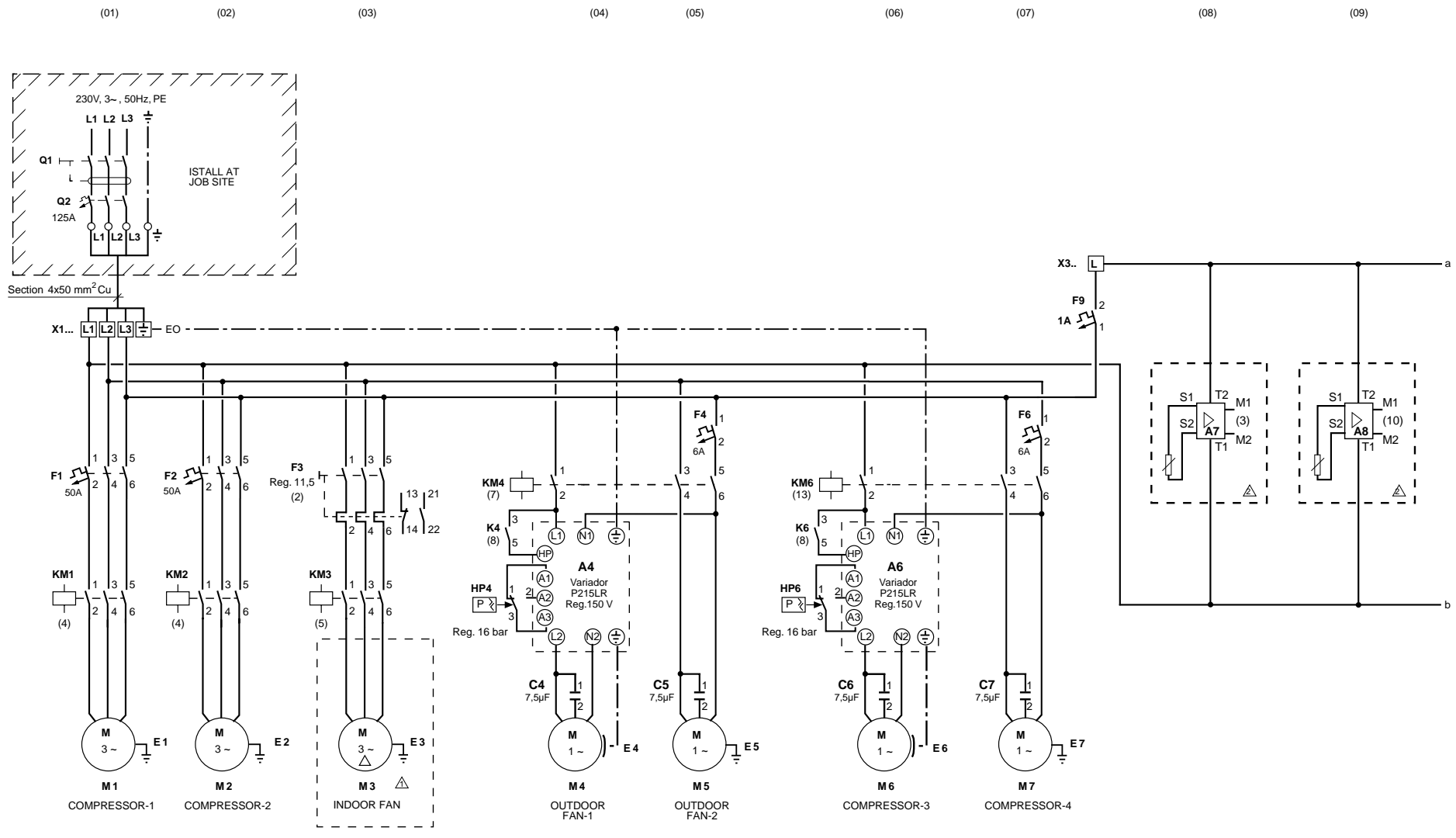
MODEL	Q2 (A)	SECTION "B" mm ²	F1(A)	F2(A)	F3 (A) REG. "C"
SOH-150	80	4x25	32	32	6,5
SOH-180	100	4x35	40	40	11,5



NOTE: - INDOOR FAN "M3" IS TO BE CONNECTED AT JOB SITE. CABLE SECTION 1,5 mm².
 - PROTECTION MODULES A7 AND A8 ARE MOUNTED SCROLL COMPRESSORS ONLY

THE COMPONENTS INCLUDED IN THESE BOXES ARE NOT SUPPLIED BY THE MANUFACTURER

I-1988-1d
 SOH-B/G, 150, 180
 230.3.50



NOTE: - INDOOR FAN "M3" IS TO BE CONNECTED AT JOB SITE. CABLE SECTION 1,5 mm².
 - PROTECTION MODULES A7 AND A8 ARE MOUNTED ON SCROLL COMPRESSORS ONLY.

THE COMPONENTS INCLUDED IN THESE BOXES ARE NOT SUPPLIED BY THE MANUFACTURER

I-1988-2d
 SOH-B/G, 240
 230.3.50

AIR CONDITIONING

HEATING

TILES

BATHROOMS

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